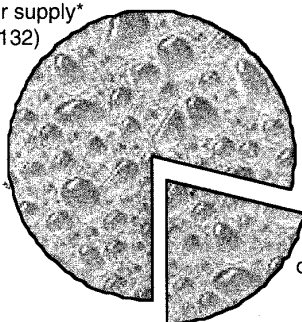


## Ground Water Dependence in Virginia

Ground water dependent community water supply\* systems (1132)

79%

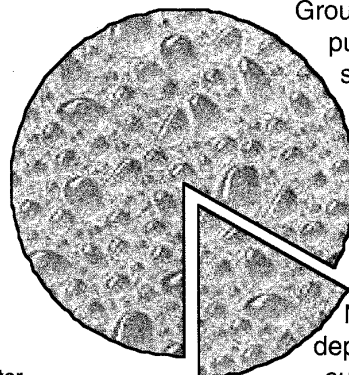


Non-ground water dependent community water supply systems (280)

21%

Ground water dependent public water supply systems\*\* (3439)

83%



Non-ground water dependent public water supply systems (690)

17%

\* waterworks that serve residential populations

\*\*water supply systems that serve drinking water to 25 or more people, or in the case of residential connections, to 15 or more residences, at least 60 days out of the year.

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## I. PERSPECTIVE

### Ground Water Protection Steering Committee 1998 Activities

The Ground Water Protection Steering Committee's twelfth year was marked by a number of educational sessions at the Committee's bimonthly meetings as well as continued emphasis on the goals of the 1995 *Supplement to the Ground Water Protection Strategy for Virginia*.

The year began with Bruce Dotson soliciting ideas, resources, and personnel (for an Advisory Committee) from Steering Committee members to develop a model wellhead protection publication that would provide a set of practical tools for wellhead and other source water protection. Mr. Dotson, chair of the Department of Urban and Environmental Planning at the University of Virginia, anticipates having the publication available for distribution at the end of 1998 (see related notice on page 11).

*continued on back cover*

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## II. ACTIVITIES and SERVICES

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### ***Agricultural Stewardship Act: The First Year— Ground Water Cases***

The first year of implementing Virginia's new Agricultural Stewardship Act (ASA) has provided varied experiences and lessons for its implementors in the Virginia Department of Agriculture and Consumer Services (VDACS). In the year after the Act went fully into effect on April 1, 1997, VDACS received over 75 telephone calls and letters regarding farming activities that people thought might be causing pollution. Some of the calls and letters concerned matters over which the ASA has no jurisdiction, such as odor or air pollution, and thus were directed elsewhere for assistance. Of those calls and letters that fell within the ASA's jurisdiction over water pollution, 46 became official complaints that VDACS investigated, and several dealt with ground water. Two of the ASA ground water cases will be discussed below for the concepts they illustrate.

The first of the cases involved farming practices in a field with a depressed-area sinkhole. The complainant was concerned that the poultry litter that the farmer used to fertilize the field had contaminated the complainant's drinking water well. The complaint came from the Shenandoah Valley, an area characterized by karst topography.

Karst topography has limestone as an underlying layer of bedrock. Over millennia, as water seeps through the topsoil to bedrock, the water has caused a chemical reaction with the limestone, dissolving it. The result is bedrock with fissures and fractures throughout, as well as holes on the land surface where the rock underneath has dissolved. Some of these holes are actually open, while others are still covered with soil and vegetation. Karst has many other fascinating features, such as caves and disappearing rivers, that result from the interaction of water and limestone.

To analyze this complaint, VDACS' ASA coordinators consulted with Dr. Ernest Kastning of Radford

University, an expert in karst topography. Dr. Kastning explained that sinkholes are divided into five classes according to their vulnerability to pollution. (See classification table.) The most vulnerable are those that have openings that lead directly to the ground water below (Types I and II). The least vulnerable are mere depressions in the earth's surface over rock with no visible openings and with soil covering (Types IV and V).

Fortunately, in this ASA case, the sinkhole was a simple depression with soil covering, thick vegetation, and no visible openings. Such depressions are common in fields throughout the Valley. During rain events, water ponded in the depression, which confirmed the idea that this depression was a sinkhole within the least vulnerable class (Type 5). Consequently, VDACS was unable to prove that the use of poultry litter on the field and in the depression in particular was causing pollution of the complainant's well, so the case was dismissed. Ground water was not at risk from the farming activities on and around this sinkhole.

From this first "close encounter" with sinkholes, the ASA staff learned to employ the classification system to their advantage. In any future sinkhole cases, the most vulnerable types of sinkholes are those most likely to result in well-founded complaints requiring action by the farmer to correct any problems or practices that may lead to pollution through the vulnerable sinkhole. In difficult cases, assistance with dye traces may be requested to try to determine the ultimate destination of material applied near the sinkhole. The classification system and dye tracing techniques will undoubtedly help solve

some problems as they arise in the future.

The second case was quite different. A lake in central Virginia was producing very high readings of fecal coliform, and the complainant, a member of the lake homeowners' association, alleged that the farm near the lake was causing the water pollution. The complainant alleged that manure from the livestock was introducing fecal coliform to the lake via a small tributary that runs through the middle of the farm and discharges into the lake.

The farm currently raises beef cattle and employs some best management practices to protect water quality. For example, the farmer maintained thick vegetation along streambanks so that it filtered excess runoff. The pastures were also well-vegetated, which also helped prevent manure from reaching the tributary. These physical and management features suggest proper management by the farmer to prevent the delivery of manure from pastures to surface waters, so the investigators decided to take a series of water samples to try to resolve the question of where the fecal pollution was coming from.

Three springs on the farm fed the small tributary. One spring was covered by blackberry bushes near one of the farm's property lines, which meant that the cattle could not get to that spring. Another spring was enclosed in an old spring house, which meant the cattle could not get to that spring either. The final spring was not covered, and the cattle could reach it.

The investigators took five samples in all: two from the tributary itself, with samples from the point where it flowed onto the farm, and one from the point where it exited the farm, flowing to the lake. They also took samples from each of three springs. The map on page 3 illustrates the sampling points.

The results were at first puzzling. The samples from the tributary itself at the points where it entered and exited the farm both showed 300 cfu/100ml of fecal coliform - high but still within the acceptable range. Whatever was happening on the farm was not changing water quality within the

Funding for the Virginia Ground Water Protection Steering Committee activities, including development of this Report, is provided through a grant to the Department of Environmental Quality by the US Environmental Protection Agency.

tributary. The results from the springs were much higher: 900 to 1600 cfu/100ml, regardless of whether or not the cattle had access to the spring.

These results strongly suggest that the ground water in the area is being contaminated by some source that produces fecal coliform. This in turn may mean that the contaminated ground water is the cause of the lake's high fecal coliform readings. Although the source of the ground water contamination is still unknown, VDACS is presenting the problem to various researchers who may be interested in solving the mystery through the use of promising new techniques, such as DNA finger-printing or waste isotope tests. ■

### Sinkhole Classification Table\*

In order to display the relative speed at which a sinkhole will drain, a simple classification was developed. The following are in order from the least vulnerable (poorly drained) to the most vulnerable (well drained):

**Type V:** Soil-covered sinkhole with no obvious sinkpoint. Poorly drained. May pond after rainfalls. May contain water-tolerant plants.

**Type IV:** Soil-covered sinkhole with no obvious sinkpoint. No signs of ponding. Fairly well drained.

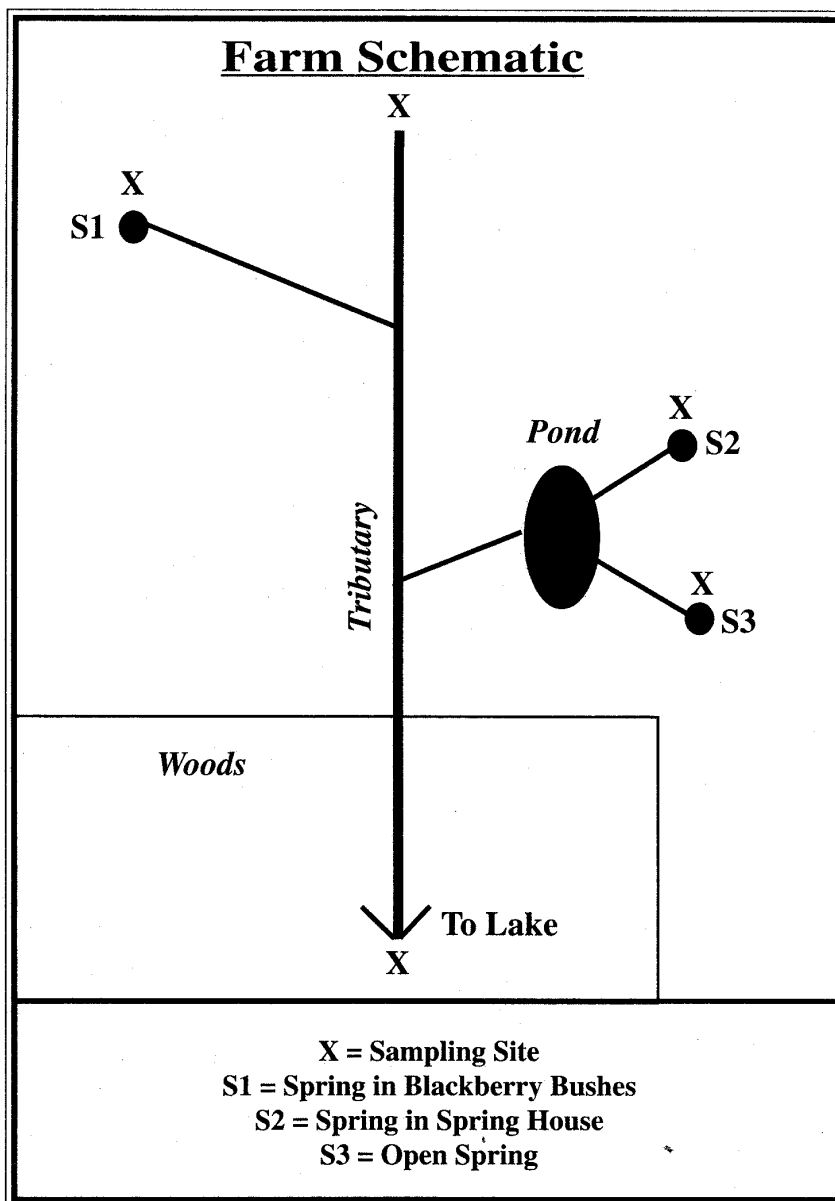
**Type III:** Exposed bedrock sinkhole with no obvious sinkpoint. No signs of ponding. Fairly well drained.

**Type II:** Soil-covered sinkhole. Obvious sinkpoint. Very well drained.

**Type I:** Exposed bedrock sinkhole. Obvious sinkpoint. Very well drained.

**Class V Injection Well:** A sinkhole, crack, or fissure that has been modified or improved by man to allow efficient drainage of surface waters.

\*Source: *Proceedings, Karst-Water Environment Symposium, Oct. 30-31, 1997*. Virginia Water Resources Research Center, Virginia Tech, 540-231-5624



### • Virginia On-Line

This "world wide web" home page is accessible via the Internet and provides information from a growing range of state agencies and programs. Virginia On-Line's URL address is <http://www.state.va.us/>

### • Spread the Word

Do you know of an individual or organization who would benefit from receiving a copy of this and future Annual Ground Water Reports? Call Mary Ann Massie at (804) 698-4042 to add names to the mailing list.

## Computer Model Aids Management of Ground Water Resources in Eastern Virginia

A growing population and economy are increasing the demands for water supply in eastern Virginia's portion of the Coastal Plain province. Usable surface water is becoming more difficult to obtain in the area, so reliance on ground water will increase. During 1992, ground water provided about 14 percent of the water used for public supply and manufacturing in the Virginia Coastal Plain. In addition, ground water is the only source of water for domestic use in widespread rural areas. Ground water withdrawals in the Virginia Coastal Plain have increased steadily for several decades, reaching about 94 million gallons a day in 1992, and have led to declining ground water levels, as deep as 160 feet below sea level near major pumping centers.

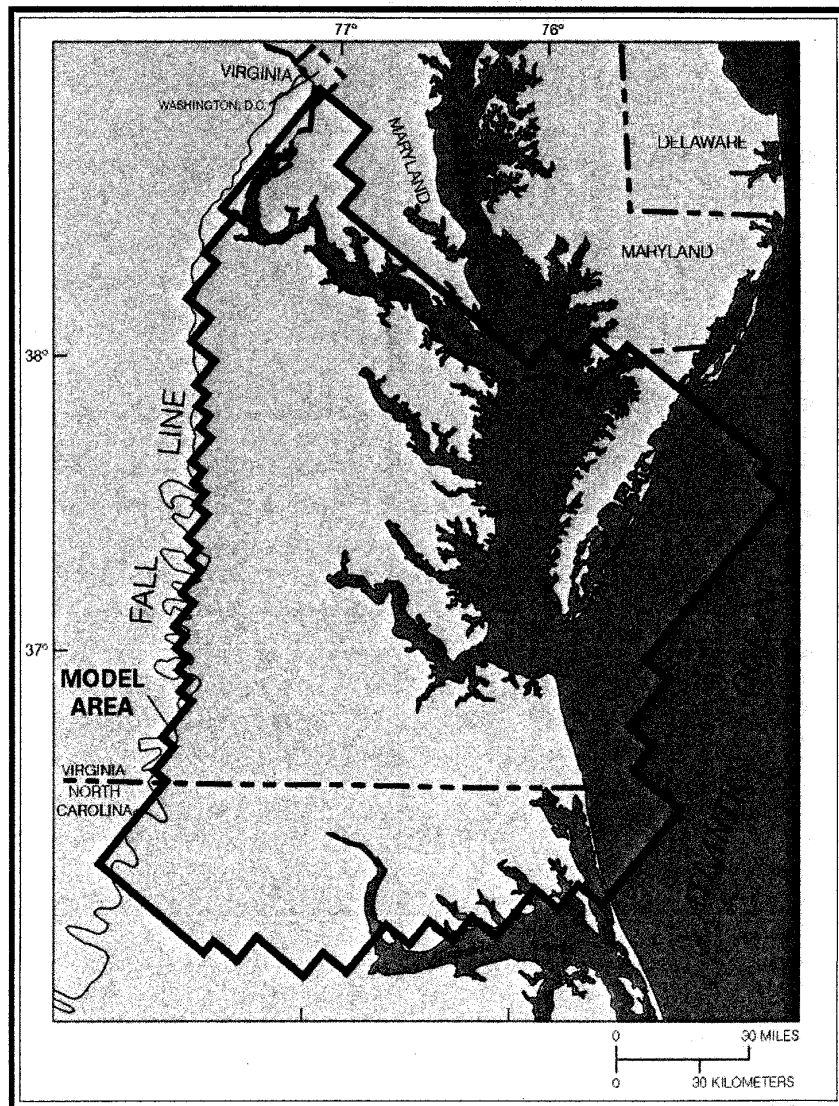
The Commonwealth of Virginia recognizes that ground water withdrawals must be managed carefully in order to safeguard the public's welfare and support a healthy economy. Accordingly, two Ground Water Management Areas have been declared in the most greatly affected part of the Coastal Plain, wherein major ground water users—those who withdraw 300,000 gallons per month or more—are required to obtain ground water withdrawal permits from the Virginia Department of Environmental Quality (DEQ).

In addition, the Virginia Coastal Plain aquifers are known to make up a complex and interconnected hydrologic system; large ground water withdrawals can have wide-ranging effects that cross city, county, and even state boundaries. Therefore, to assure that the aquifers continue to provide a reliable, long-term water supply, valid and efficient means are needed to systematically evaluate—the combined effect of numerous actual and proposed withdrawals.

Working in cooperation with DEQ and other State and local agencies, the U.S. Geological Survey (USGS) has developed and maintained a ground water flow model of the Virginia Coastal Plain. First constructed in the early 1980s as part of the USGS nation-wide Regional Aquifer System Analysis (RASA) program, the model was designed to help scientists better understand how the ground water flow system operates and how it is influenced by withdrawals.

The model consists of a computer program and related data sets that simulate the ground water flow system. Input data were compiled that

specify features which control ground water flow, such as the locations and properties of the aquifers, sources of water from recharge, and losses of water from discharge and pumping. The program can then "read" the input data and perform calculations that generate output data representing ground water conditions, such as levels, flow rates, and directions. The model thereby allows large amounts of data to be synthesized to test ideas about how the ground water flow system works. Model simulations can be performed based on current conditions to understand the existing flow system, but can also be performed based on possible future



conditions to predict how the flow system will respond.

Model predictions concerning the effects of several pumping scenarios in southeastern Virginia significantly influenced the Commonwealth's decision to adopt the Ground Water Management Act of 1992. This legislation fundamentally changed the permitting process in the Virginia Coastal Plain: permits are no longer issued in perpetuity, but must be renewed every 10 years, and users are allowed to withdraw only as much ground water as they need.

Since the model was first constructed, the USGS has continued to gather more information on the Coastal Plain hydrogeologic framework (the elevation, thickness, and lateral extent of the aquifers), and has revised the original RASA model accordingly. In addition, simulations have been performed using updated ground water withdrawal data, and the model's ability to process and display data has been expanded using a geographic information system. The current model is used by withdrawal-permit applicants, consultants, DEQ, and the USGS to predict the effects of proposed major withdrawals, evaluate the cumulative effect of actual and proposed withdrawals, and examine on-going trends in ground water conditions.

Although the current Virginia Coastal Plain model has significantly enhanced the Commonwealth's ability to manage this important water resource, updating is essential to maintain the model as a useful ground water management tool. Some shortcomings are known to remain in the current model, and a revised model is now needed to improve the accuracy of water-level simulations and to respond to increasing stresses from ground water withdrawals.

Several new sources of information need to be included in the model. Little is known of ground water conditions in the Northern Neck and Middle Peninsula, which will likely be included as part of Virginia's designated ground water management area within the next five to ten years. In addition, recent findings indicate that an asteroid or comet struck the Earth about 35 million years ago near the mouth of the

Chesapeake Bay and disrupted many of the aquifers there. Important connections of the aquifers with streams and rivers along the Fall Zone, a major regional recharge area, are being found that could control the supply of ground water to much of the Coastal Plain. Lastly, withdrawals are increasing in areas near the model boundaries, where the current form of the model is least accurate.

The Virginia Coastal Plain ground water flow model has provided scientists and resource managers with an effective means to understand the aquifer system and to safeguard the water supply. Improving the model's capabilities will maintain its ability to incorporate the most up-to-date knowledge of ground water conditions and to address emerging demands on the resource.

*For more information, contact Randy McFarland, USGS, at 804-278-4750, ext. 267. ■*

## ***Educators Get the Ground Water Picture***



More and more teachers and students are learning about Virginia's ground water through Project WET (Water Education for Teachers). Nearly 1,000 classroom teachers and community educators were trained this year at six-hour WET workshops sponsored by the Department of Environmental Quality. The workshops model interactive lessons from curriculum guides such as "Get the Ground Water Picture" and provide materials and resources.

Virginia's Project WET program also loans water resources "trunks" to educators. These trunks include a ground water flow model, maps, audio tapes and other instructional aids and can be borrowed from state parks.

In addition, ground water will be the focus of one session at the November meeting of the Virginia Association of Science Teachers (VAST). The teachers will participate in ground water activities from the WET curriculum guide and will be invited to participate in ground water workshops planned for 1999. Attendees at the 1999 workshop will receive a copy of the new WET Ground Water curriculum guide. Interested participants should contact Ann Regn, Environmental Education Coordinator, at 804-698-4442 or email: [amregn@deq.state.va.us](mailto:amregn@deq.state.va.us) ■

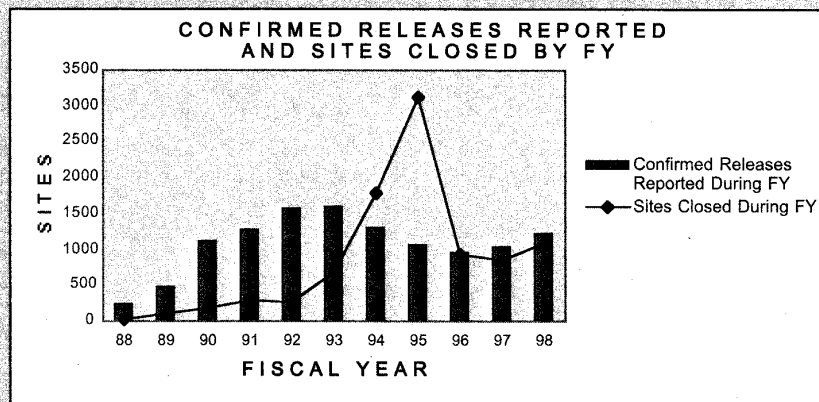
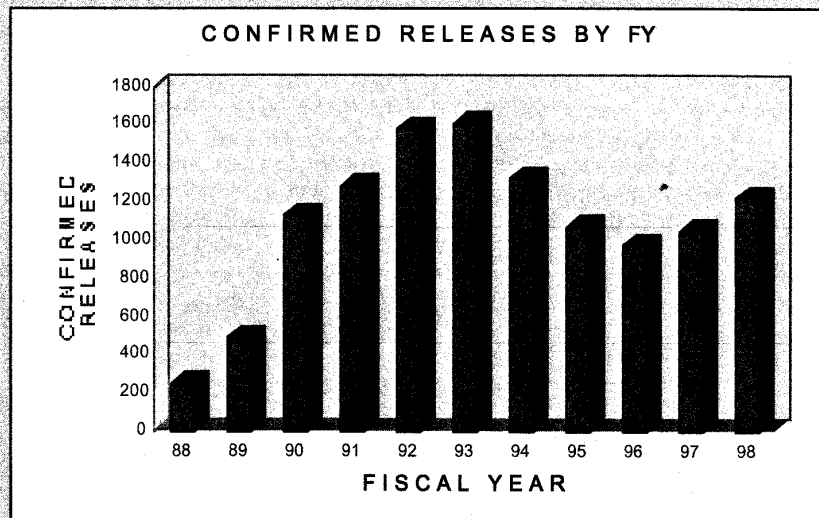
**Come visit the  
Ground Water  
Protection  
Steering  
Committee's  
World Wide  
Web site at:**

**[http://www.deq.state.  
va.us/gwpsc/  
home.html](http://www.deq.state.va.us/gwpsc/home.html)**

## Leaking Petroleum Storage Tank Cleanups and Reimbursement

During the past ten years almost 12,000 releases of petroleum from storage tanks have been reported to the DEQ (see chart). These reported releases include both underground and aboveground storage tanks. Although gas stations and bulk storage facilities are normally thought of as sites for leaking tanks, it is not uncommon for releases to also be reported by government agencies, industry, stores, schools, and homeowners. In fact during the last two years over 650 home heating oil releases have reported to the DEQ.

The Petroleum Storage Tank Program uses a risk-based approach to determine the amount of cleanup necessary at a site. Releases from sites which impact a receptor (e.g., a stream or drinking water well) require corrective action to address the receptor. If petroleum contaminated ground water is seeping into a stream, cleanup of the ground water is required so that stream water quality standards are met. In cases where a drinking water well is impacted, corrective action must include provision of a clean drinking water source for the contaminated well. At all



## New Filing Deadline for Petroleum Tank Cleanup and Third Party Liability Claims

A new reimbursement claim filing deadline for leaking petroleum storage tank sites went into effect this month as a result of a change in state law. The deadline for filing claims is now two years after the date the Department of Environmental Quality closes the investigation and cleanup activities for a site (case closure date).

Any cases closed prior to July 1, 1998 (the date the new law became effective) were given a new reimbursement filing deadline of July 1, 2000. For cases closed after July 1, 1998, the deadline is two years after the closure-letter date.

State law prohibits payment of cleanup and third party liability costs from the petroleum storage tank fund for claims received after the filing deadline.

Please remember, only underground storage tank cleanup costs incurred after December 22, 1989, and aboveground storage tank cleanup costs incurred after January 1, 1992 are eligible for reimbursement. Also, reimbursement claims must still meet all other eligibility requirements and comply with the instructions in the DEQ Reimbursement Guidance Manual.

For further assistance, please call the DEQ Reimbursement Customer Service Line at (804) 698-4358 or (804) 698-4298, or e-mail (tank@deq.state.va.us). To obtain a copy of the Reimbursement Guidance Manual, you may download the file from our web page ([www.deq.state.va.us](http://www.deq.state.va.us)) or call the Customer Service Line and request that a copy be sent by mail. ■

## Petroleum Storage Tank Program Update

The State Water Control Law and the Petroleum Underground Storage Tank Financial Responsibility Program Regulation (9 VAC 25-590-10 et seq.) were amended to permit DEQ to receive delegation of the Virginia UST Program from EPA by the end of 1998. No additional paperwork will be required in order for the regulated community to comply with these amendments.

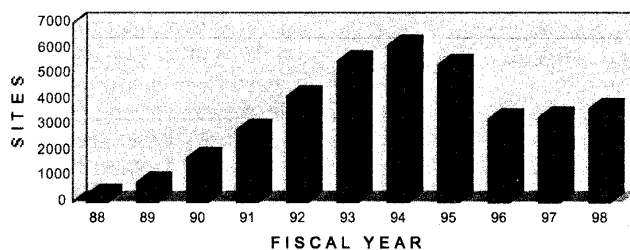
The Regulation was also amended to incorporate the federal lender liability exemption for regulated USTs, and to add several mechanisms for local government entities to use to demonstrate financial responsibility. ■

sites, even if there is no risk identified, the source of contamination must be stopped, free product removed, and saturated soils cleaned up. This minimum requirement allows for natural processes over time to continue cleanup of sites.

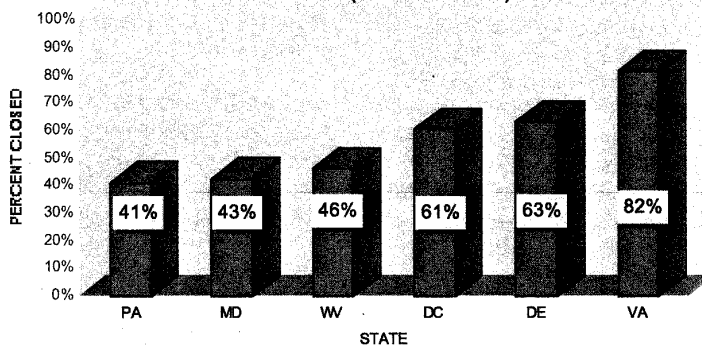
This practical approach has allowed the DEQ to manage the program so that releases which impact human health and the environment are given a high priority and cleaned up. During the past year the DEQ Regional Offices managed over 3,600 active sites. Of the almost 12,000 reported releases, the DEQ has been able to complete corrective action on 9,400 sites and close these cases. A comparison of Virginia's program to other those of other states shows the Commonwealth's completed cleanup percentage significantly higher than the surrounding states (see chart, below right). The DEQ believes that our risk-based cleanup approach is the reason for the higher percentage of cleanups completed as compared to the other states.

Another factor which has contributed to the success of the DEQ cleanup program has been the availability of the Virginia Petroleum Storage Tank Reimbursement Fund. Since 1990, the DEQ has reimbursed tank owners \$67 million, including over \$15 million reimbursed this year. ■

ACTIVE SITES BY FISCAL YEAR



CLEANUPS COMPLETED (CLOSED CASES)



## Virginia Rural Water Association Update

The Virginia Rural Water Association (VRWA) provides classroom and on-site training opportunities to water and wastewater utilities statewide. On-site technical assistance is provided by an increasing number of programs ranging from a water Circuit Rider to a Groundwater Technician.

To contact VRWA for information about these services:

**Phone:** 540/261-7178

**Fax:** 540/261-2465

**E-mail:** emdrbrown@rockbridge.net

VRWA's website is under construction, and will be up and running by end of September. The National Rural Water Association (NRWA) has a website (<http://www.nrwa.org>) that has links to all the state Rural Water Associations. ■

## The Ground Water Protection Steering Committee *Meeting*

is held the third Tuesday  
of every other month

(January—March—May—July—September—November)

Feel Free to Attend—

meetings are held at the Dept. of Environmental Quality,  
629 E. Main St., Richmond, from 9 a.m. to noon.

for more information, contact  
Mary Ann Massie, DEQ, at 804-698-4042

## ***The 1998 UST Deadline—***

***Please Don't Wait  
Until December 22, 1998!***

If you own a regulated underground storage tank (UST) that was installed prior to December 23, 1988, you are required to upgrade or close the system by December 22, 1998 under state and federal requirements. Waiting until the last minute to upgrade may increase your upgrading costs due to higher demand for a limited number of contractors.

In general, regulated USTs include underground commercial, business, and public sector tanks over 110 gallons capacity containing petroleum or hazardous products. Exempt from the program are farm and residential tanks of less than 1,100 gallons capacity containing motor fuel for noncommercial purposes (not for resale) and all heating oil tanks containing heating oil for consumption on the premises where stored.

Some 13,000 UST owners in Virginia have approximately 75,000 USTs at their 25,000 facilities. Over 35,000 of these tanks have been closed in the past 20 years and about 40,000 remain in use with some 32,000 existing tanks facing the 1998 upgrade deadline based on DEQ records.

An EPA booklet entitled "Don't Wait Until 1998" is available from the EPA RCRA Hotline at 1-800-424-9346 or from the nearest DEQ office on the list below. It explains in plain language the options and requirements for 1998.

The main options are to upgrade your existing substandard tank or to close it. Closing a tank involves removal or filling the tank in place with an inert material. Replacement is also an option, but is the most costly approach since you must properly close your existing tank and install a new one. Analyze your options carefully. For example, closing your tank may cost more than simply upgrading it, so take some time to check out the various costs before you act.

As an example, to upgrade an existing UST system properly for the 1998 deadline, it must, at a minimum, (1) have a spill bucket at the fill pipe (\$200-\$700); (2) have an overfill device/ alarm to prevent overfilling the tank (\$200-\$700); and, (3) be cathodically

protected or lined (\$2,000-\$5,000). Costs vary greatly, so always get several bids.

Remember to contact your local building official for a permit and the proper inspections before any UST installation, upgrade, repair, or closure.

Spill buckets and overfill devices are not required on tanks that only have transfers of less than 25 gallons, such as used-oil tanks. If you installed your UST system after December 22, 1988 it should have had all three of these requirements (spill, overfill, and corrosion) and release detection upon installation. After May 8, 1985, nationwide, all UST systems had to be installed with corrosion protection, so check on this beforehand before incurring that expense.

As a reminder, monthly release detection has been required on all active tanks since 1993. So don't forget to continue to perform leak detection for as long as you use the tank and make sure your method is still acceptable.

For some tank owners, temporary closure of the UST may be an option to gain some time to make decisions and avoid the December 22, 1998 deadline rush with its associated higher costs and limited contractor availability. For temporary closure, the local building official issues a permit and you must cease using the tank for up to 12 months. See the UST regulations for the proper procedures for temporary closure.

Please contact Russ Ellison at (804) 698-4269 or Amy Harshman at (804) 698-4313 should you have any questions or need assistance. You may also contact your nearest DEQ Regional Office for information at the locations listed below.

Southwest Regional Office  
355 Deadmore Street  
Abingdon, VA 24210  
(540) 676-4800

Piedmont Regional Office  
4949-A Cox Road  
Glen Allen, VA 23060  
(804) 527-5020

West Central Regional Office  
3019 Peters Creek Road  
Roanoke, VA 24019  
(540) 562-6700

Tidewater Regional Office  
5636 Southern Blvd.  
Virginia Beach, VA 23462  
(757) 518-2000

Northern Regional Office  
13901 Crown Court  
Woodbridge, VA 22193  
(703) 583-3800

Valley Regional Office  
4411 Early Road  
Harrisonburg, VA 22801  
(540) 574-7800 ■

## ***Amendments to Ground Water Withdrawal Regulation***

The State Water Control Board adopted amendments to the Ground Water Withdrawal Regulation in July 1998. These amendments (1) establish regulatory requirements for agricultural withdrawals, (2) incorporate language from the 1994 legislative amendment regarding the issuance of ground water withdrawal permits based solely on historic use to community waterworks, (3) require DEQ to perform technical evaluations of proposed withdrawals, and (4) establish a periodic review of the regulation. These amendments will become effective January 1, 1999.

The Department of Environmental Quality has significantly increased staffing in the ground water withdrawal program to address these amendments. Two ground water modeling positions have been created and filled to perform the technical evaluations of proposed withdrawals. (Please see the related article on the Coastal Plain ground water flow model, "Computer Model Aids Management of Ground Water Resources in Eastern Virginia," page 4.) An additional staff position is planned which will be dedicated to the issuance of ground water withdrawal permits to agricultural ground water users.

For copies of the revised Ground Water Withdrawal Regulation or information regarding this program please contact Terry Wagner at (804) 698-4043. ■

## Virginia Water Resources Research Center Update

The Virginia Water Resources Research Center has revived its newsletter and given it a new name, the *Virginia Water Central*. Published bimonthly, the first issue came out in June 1998. *Water Central* contains feature articles on current water-related issues, scientific information related to current water issues, summaries of water-related news items that may have received little media coverage, notices about miscellaneous events, publications, and news from the Center, and an information guide to help readers find water-related information. A goal of *Water Central* is to complement the information available on the World Wide Web. If you would like to obtain a printed copy of the newsletter, send your request to: Virginia Water Resources Research Center, Virginia Tech, 10 Sandy Hall (0444), Blacksburg VA 24061; (540) 231-5624; FAX (540) 231-6673; e-mail (water@vt.edu).

Another way the Center is providing up-to-date information on water topics (and access to *Water Central*) is through our web site ([www.vwrrc.vt.edu/vwrrc/vwrrc.htm](http://www.vwrrc.vt.edu/vwrrc/vwrrc.htm)). A feature of the Center's web site is the Daily News Update. Each day a search is made of a number of state and regional newspapers currently on line for articles on water and environmental topics in Virginia and nearby states.

These articles are linked to our web site. By accessing our homepage each day, readers have information readily available on water issues across the state and beyond.

Abingdon, Virginia will be the site for the second annual Southwest Virginia Water Symposium '98 and Workshop on October 29th and 30th. The goal of the symposium is to highlight water-related research, education, management, and outreach activities in Southwest Virginia, assess our progress in the 1990s, and discuss strategies for the year 2000 and beyond. Registration packets may be requested from the Center by mail, phone, or e-mail (tyounos@vt.edu, or jupoff@vt.edu). ■

## Ground Water Guardians Affiliate Team Formed

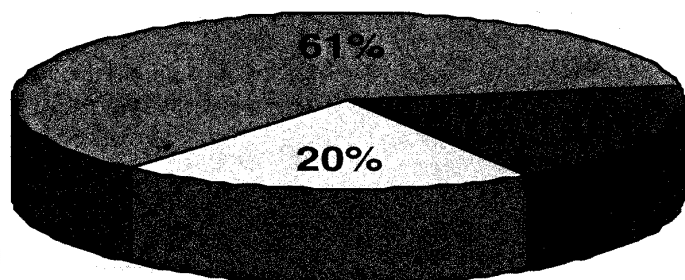
The concept for Ground Water Guardians and Affiliates was developed by the Ground Water Foundation. The Guardian program is designed to encourage public involvement in ground water protection. Guardian programs are generally tied to communities or businesses. In 1997, 143 communities representing 36 states, Canada, and Mexico achieved Ground Water Guardian designation, forming teams and implementing ground water protection programs.

A Ground Water Guardian Affiliate is an entity that works to promote shared responsibility for ground water protection, promotes the Guardian program, and understands the importance of working in partnership with communities and businesses on ground water protection goals. Twenty-two Ground Water Guardian Affiliates, including a team from Virginia, were designated in 1997. Their efforts were recognized at the November 1997 National Ground Water Guardian Designation Conference and Ground Water Educators Workshop. Virginia Team member Carol Zokaite accepted the award and participated in the workshop.

Terri Brown of the Department of Conservation and Recreation is the driving force behind the Virginia team. Terri organized the effort and recruited the volunteers to serve on the team. She works to keep everyone informed of the individual member activities. Members include staff from federal, state and local organizations, non-profit groups, and environmental interest groups. Each year the group submits a plan, or Result Oriented Services (ROS), for the coming year. The Virginia team met in April to review our ROS and to discuss opportunities for improved networking and outreach and education efforts. The team plans to meet in late summer to develop progress reports prior to the fall Ground Water Guardian meeting and establish a summary of ground water grant opportunities. Anyone interested in participating should contact Terri Brown at 540-674-5541 or [vakarst@juno.com](mailto:vakarst@juno.com). ■

## VIRGINIA'S PESTICIDE DISPOSAL PROJECT

Localities Served 1990-1996



Localities to be Served 1998

Localities Served 1997

The Virginia Pesticide Control Board and the Virginia Department of Agriculture and Consumer Services have been conducting a pesticide disposal program for farmers, pesticide dealers, and pest control firms since 1990. The program assists these groups with the proper disposal of unwanted pesticides they are currently storing. By 1996, over 517,000 pounds had been collected and disposed of from more than 1,200 participants in 63 localities. The Board and Department will complete the project in 1998, with the remaining 21 localities participating.

## ***Virginia's Source Water Assessment Program***

The 1996 Amendments to the Safe Drinking Water Act (SDWA) require each State to develop a Source Water Assessment Program (SWAP) that will:

“delineate the boundaries of the assessment areas in such State from which one or more public water systems in the State receive supplies of drinking water, using all reasonably available hydrogeologic information on the sources of the supply of drinking water in the State and the water flow, recharge, and discharge and any other reliable information as the State deems necessary to adequately determine such areas;” and

“identify for contaminants regulated under this title for which monitoring is required under this title (or any unregulated contaminants selected by the State, in its discretion, which the State, for the purposes of this subsection, has determined may present a threat to public health), to the extent practical, the origins within each delineated area of such contaminants to determine the susceptibility of the public water systems in the delineated area to such contaminants.”

In addition, “The State shall make the results of the source water assessments conducted under this subsection available to the public.”

The Virginia Department of Health (VDH) is in the process of developing the state’s strategic approach to conducting the assessments, including the state’s criteria for delineating the boundaries of the source water assessment areas, the significant potential sources of contamination to be inventoried in the delineated area, and the methodology for completing susceptibility determinations for each source.

VDH is developing the SWAP by utilizing three separate committees/teams as described below:

**Source Water Protection Team:** The Source Water Protection Team is made up of VDH representatives and members from the Waterworks Advisory Committee described below. Their function is to develop the details of the SWAP with guidance from the other two committees.

**Source Water Assessment Technical and Citizens Committee (TAC):** The TAC was established to meet the SDWA public participation requirements. Some of this committee’s functions include advice and guidance on the Team’s recommendations, responding to EPA’s specific questions listed in the guidance document, and providing final concurrence on the SWAP. Most of the Ground Water Protection Steering Committee member agencies are represented on the TAC.

**Waterworks Advisory Committee (WAC):** This is an existing committee that offers a wide array of technical and citizen involvement. The WAC has general oversight and input, and their concurrence on the SWAP will be obtained prior to submittal.

The major goal of the SWAP is to develop an assessment approach that will provide protection and benefit the waterworks. It will provide for monitoring flexibility and meaningful information to (1) direct ongoing source water protection efforts and (2) improve the overall drinking water program in the state. It will be available to waterworks owners who will be encouraged to proceed with source water protection programs. It will utilize relevant data from existing state and federal databases as appropriate. Source water assessments of all sources will be completed within 42 months of EPA approval of the SWAP.

Efforts will be directed at maximizing the use of existing information. This information will include: (1) data developed in completing the Ground Water Under Direct Influence of Surface Water (GUDIS) assessments; (2) data compiled to evaluate applications for waivers to Phase II/V monitoring; (3) data from sanitary surveys of waterworks conducted by VDH personnel; and (4) results from chemical and

bacteriological monitoring programs and evaluation of a waterworks’ compliance with Virginia’s comprehensive design and construction regulations.

The source water assessments will direct where and how intensified site-specific source water protection will be needed and will include maps of source water areas showing delineations and inventoried land uses/activities, susceptibility determinations necessary for tailoring alternative monitoring for chemical contaminants, and information useful for future regulatory decisions (e.g., Ground Water Rule).

The United States Geological Survey (USGS) will provide support on a statewide basis to assist VDH to assess the contamination potential of waterworks source waters in the Commonwealth. A study will identify the intrinsic natural susceptibility of regional aquifers in Virginia and aid in screening ground water supplies to identify those that may require a higher level assessment during the source water protection phase. The study results will be used by VDH as part of the susceptibility determinations as available.

The Virginia Department of Conservation and Recreation (DCR) will provide support on a regional or location-specific basis by performing 4 to 6 geological studies per year of ground water sources in karst areas of the Commonwealth. VDH will select the ground water sources to be studied and will utilize the conclusions in the final source susceptibility determinations as available.

One of the major goals of the source water assessments is “the protection and benefit of the waterworks.” The availability of the assessment to the owner is the first step in assisting the owner in preparing a Source Water Protection Program (SWPP). VDH will be available to provide general technical assistance to waterworks owners in developing a SWPP. In addition, VDH has contracted with the Virginia Rural Water Association (VRWA) to provide direct assistance to small waterworks (populations less than 10,000) in developing and implementing a SWPP. ■

## ***Safe Drinking Water Act Amendments Point to New Public-Private Partnerships***

Successful implementation of the 1996 amendments to the Federal Safe Drinking Water Act will require voluntary cooperation by citizens to protect public water supplies. This is due to the fact that much of the land that supplies water recharge to publicly owned wells is in private ownership. Public education will go a long way toward ensuring that land is managed to minimize pollution problems and spills are reported quickly. Localities may determine that changes to zoning ordinances and comprehensive plans are necessary to fully protect ground and surface waters.

These and other issues are discussed in the report *Implementing Wellhead Protection: Model Components for Local Governments in Virginia*, which should give localities a head start on implementing new programs. The report suggests model ordinance language and approaches to ensure successful program implementation. Also included are resources for public education about ground water protection.

The new Safe Drinking Water Act amendments require every community water system to let the public know about detection of any regulated contaminants over the prior monitoring year. These new requirements are part of the Act's "consumer right-to-know" provisions contained in the "Consumer Confidence Report." Municipalities also are required to tell consumers about the source of their drinking water and health concerns for any detected contaminants. According to the U.S. Environmental Protection Agency (EPA), "the report can be a tool that starts a dialogue between consumers and their drinking water utilities and one that gets consumers more involved in decisions which may affect their health" (Federal Register, February 13, 1998).

It is hoped that expanded awareness about potential problems in

drinking water sources can lead to increased protection. Municipalities are encouraged to offer educational opportunities for citizens, such as informational brochures, public forums, curricula and other creative avenues to increase awareness of the need and methods for protecting Virginia's ground water resources.

The amendments also require agencies in charge of monitoring publicly-owned wells to assess the source(s) of public drinking water supplies and identify any threats to source water quality. Publicly owned wells are not only those wells operated by municipalities but also include Community Waterworks serving 25 or more year round residents, which may include subdivisions, schools, or highway rest areas.

In Virginia, these Source Water Assessments will be conducted by the Virginia Department of Health and are slated to begin sometime after February 1999. The assessments will include analyses of the vulnerability to contamination for all drinking water source waters, both surface and ground waters. (See article on opposite page.) Vulnerability is based on land use within a specified distance to public wells, as well as soil types, hydrogeology, and other physical factors. The amendments require that agencies communicate the results of their findings concerning vulnerability to the public.

Some localities in Virginia have already experienced problems with their wells and have embarked on wellhead protection projects. Since ground water is a transient resource that ignores political boundaries, its protection requires cooperation among different jurisdictions. The town of Fincastle in Botetourt County became active in wellhead protection after a fire and numerous septic system failures resulted in contamination of private wells in town. New town wells were dug in Botetourt County, outside of the town's jurisdiction. The City of Charlottesville relies on surface water impoundments located in Albemarle County for its drinking water supplies. Recently the subdivision of Key West in Albemarle County had to close its source well and

connect to the Water and Sewer Authority's surface water supply after petroleum byproducts were detected in the community's well.

It is not too soon for municipalities to begin planning for wellhead protection program implementation and/or expansion of existing programs to prepare for the new reporting and protection requirements. Order a copy of the implementation guide listed below and get started now! ■

*Adapted from "Implementing Wellhead Protection: Model Components for Local Governments in Virginia," September 1998. For copies of this and other reports about Virginia ground water protection strategies, contact the Virginia Department of Environmental Quality, PO Box 10009, Richmond VA 23240-0009, or call Mary Ann Massie at DEQ at (804) 698-4042.*

*Copies of the Safe Drinking Water Act Amendments and other EPA publications can be viewed on EPA's web page by logging on to:*  
<http://www.epa.gov>

**Water quality  
preservation is  
everyone's concern.**

**If you suspect a  
pollution incident  
has occurred, please  
call:**

**Department of  
Emergency Services**

**1-804-674-2400  
24-hour hotline**

... "Perspective" continued from page 1

The Steering Committee web site (<http://www.deq.state.va.us/gwpsc/home.html>) was up and running at the start of the year.

The web site includes answers to frequently asked questions, information about member agencies, links to other ground water resources, and an electronic version of each year's *Annual Report* (beginning in 1996). The first year's use of the web site averaged upwards of one hundred "hits" per month.

The Steering Committee heard presentations throughout the year from members and outside experts on a variety of ground water related topics, including:

- the Source Water Assessment Program being conducted by the Virginia Department of Health;
- the mission and organization of the U.S. Geological Survey;
- the Ground Water Guardian Affiliate Program;
- data layers used by the Virginia Economic Development Partnership's geographic information system;
- the relationship between ground water and storm water management.

Continued interest in Steering Committee and member agency activities has been demonstrated by the regular attendance of non-members at the

Steering Committee's bimonthly meetings. These welcome guests continue to bring new information and resources to the Steering Committee's attention. ■

### III. INFORMATION SOURCES

#### ***Ground Water Protection Steering Committee Membership***

##### **Dept. of Environmental Quality (DEQ), Chair**

(Web Site: <http://www.deq.state.va.us>)  
**Ground Water Protection** contact: Mary Ann Massie, 804-698-4042

**Waste Management Issues** contact: Howard Freeland, 804-698-4219

##### **Chesapeake Bay Local Assistance Department (CBLAD)**

Contact: Margie Reynolds, 804-371-0608

##### **Cooperative Extension (VCE)**

(Web site: <http://www.ext.vt.edu>)  
Contact: Waldon Kerns, 540-231-5995

##### **Dept. of Agriculture and Consumer Services (VDACS)**

(Web site: <http://www.state.va.us/~vdacs/vdacs.htm>)  
Contact: Sara Pugh, 804-786-3539

##### **Dept. of Business Assistance (DBA)**

Contact: Dean Bailey, 804-371-8228

##### **Dept. of Conservation and Recreation (DCR)**

Contact: Stu Wilson, 804-786-4382

##### **Dept. of General Services, Div. of Consolidated Laboratory Services (DCLS)**

Contact: Ed LeFebvre, 804-786-3767

**Department of Health (VDH)**  
(Web site: <http://www.vdh.state.va.us/>)  
Contact: Eric Bartsch, 804-786-1760

**Dept. of Housing & Community Development (DHCD)**  
Contact: Barry Brown, 804-371-7061

**Department of Mines, Minerals, and Energy (DMME)**  
Contact: Lynn D. Haynes, 540-523-8179

**U.S. Geological Survey (USGS), Water Resources Division**  
(Virginia District's web site: <http://www.va.usgs.gov>; Bureau-wide web site: <http://www.usgs.gov>).  
Contact: Randy McFarland, 804-278-4750, ext. 267. ■

#### **Ground Water Protection Steering Committee Website**

Do you want to learn more about the Steering Committee's work? Would you like to attend a meeting of the Steering Committee? Or maybe you just want a good source of web sites with ground water information. If so, have we got a site for you!

On the GWPSC's website, you will find information about publications, frequently asked questions about ground water in Virginia, and links to other sites. Feel free to let us know what you think of the site while you're there!

<http://www.deq.state.va.us/gwpsc/home.html>

#### ***Two New Ground Water Publications from USGS***

The U.S. Geological Survey has released two new reports on ground water in Virginia:

- *Geohydrology of the Shallow Aquifer System, Naval Weapons Station Yorktown, Yorktown Virginia*. U.S. Geological Survey Water-Resources Investigation Report 97-4188.
- *Hydrogeology of, and Quality and Recharge Ages of Ground Water in, Prince William County, Virginia, 1990-91*. U.S. Geological Survey Water-Resources Investigations Report 97-4009.

To order these reports, contact:

U.S. Geological Survey  
Information Services  
Box 25286  
Denver CO 80225-0046  
Phone orders: (800) 435-7627 ■

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